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McCLINTOCK YOUNG.

BRUSH MACHINE.

No. 544,201. Patented Aug. 6, 1895.

Fig. 1.

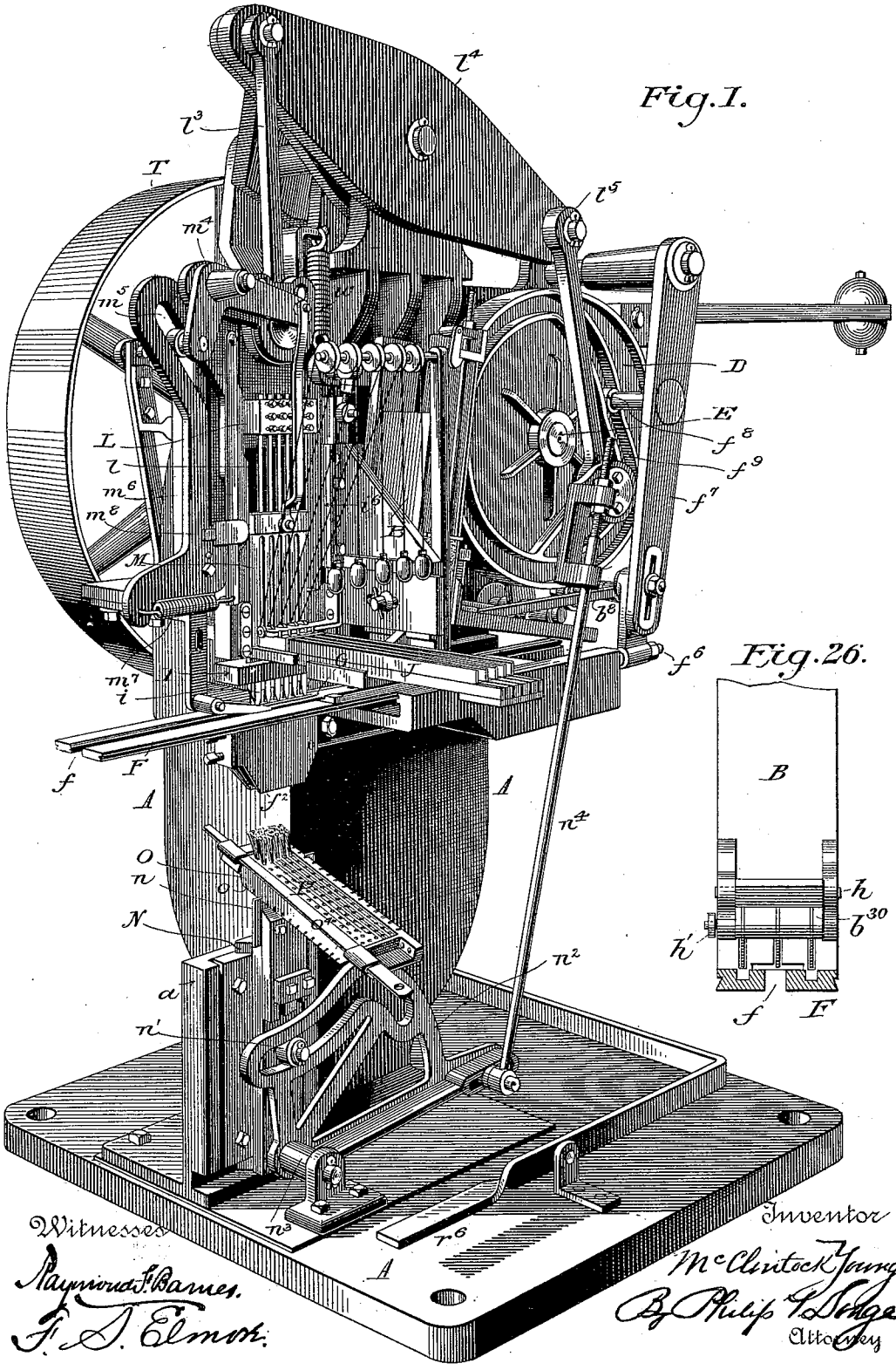

Fig. 26.

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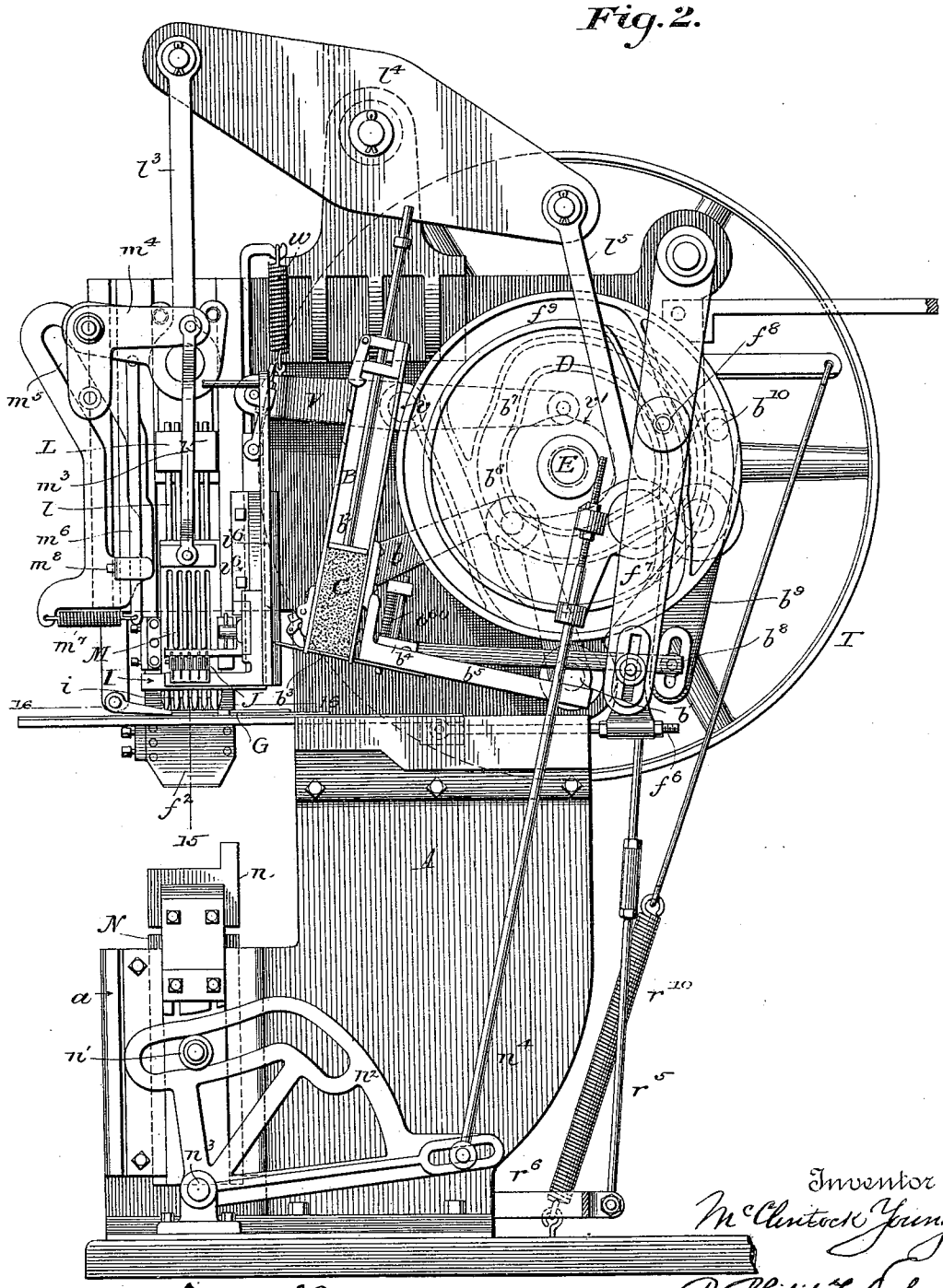
McCLINTOCK YOUNG.

BRUSH MACHINE.

No. 544,201. Patented Aug. 6, 1895.

Fig. 2.



Witnesses: Raymond B. Barnes. F. S. Elmore.

Inventor McClintock Young

By Philip T. Dodge Attorney.

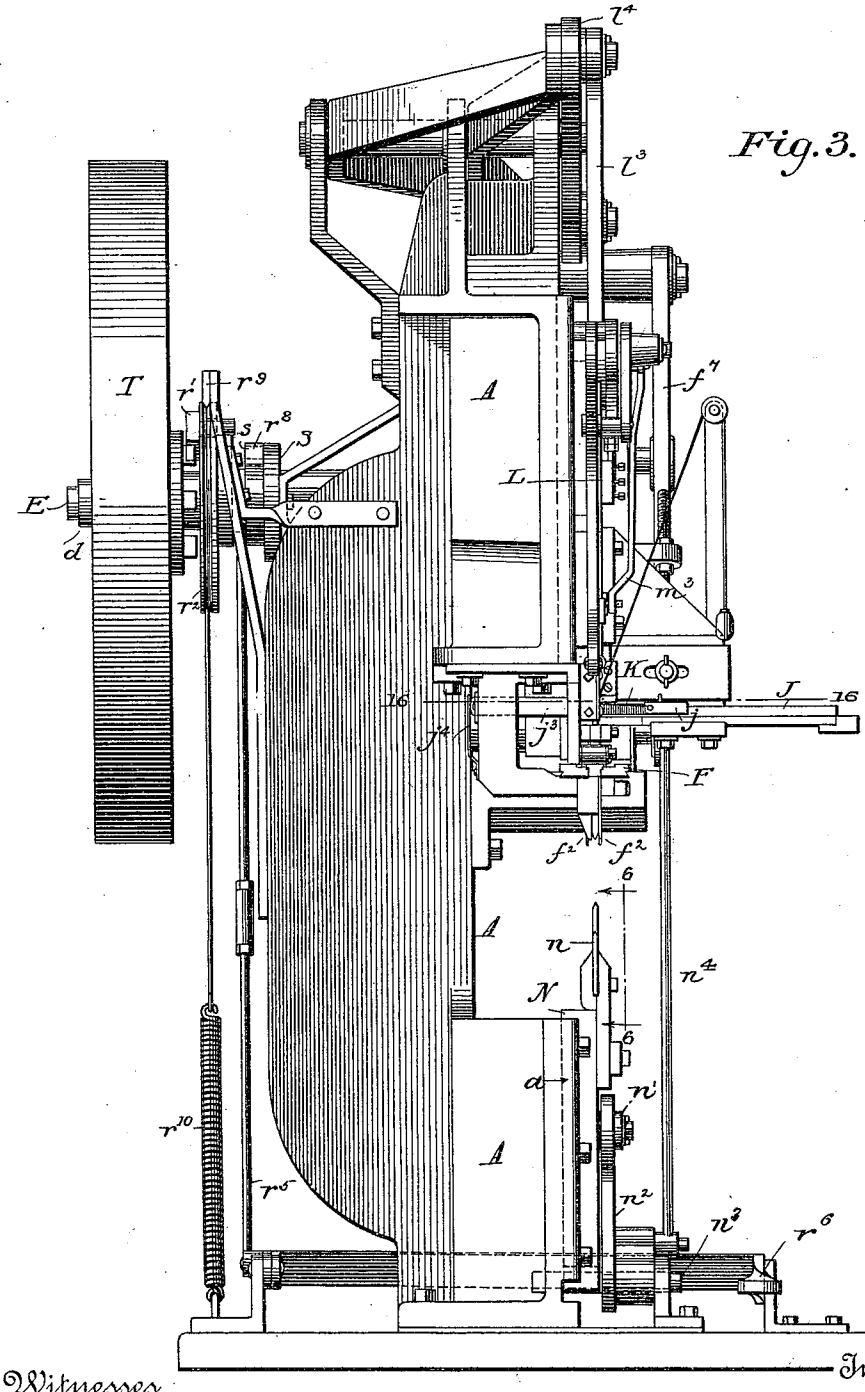
(No Model.) 9 Sheets—Sheet 3.

McCLINTOCK YOUNG.

BRUSH MACHINE

No. 544,201. Patented Aug. 6, 1895.

Fig. 3.



Witnesses
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(No Model.) 9 Sheets—Sheet 4.

McCLINTOCK YOUNG.

BRUSH MACHINE.

No. 544,201. Patented Aug. 6, 1895.

Fig. 4.

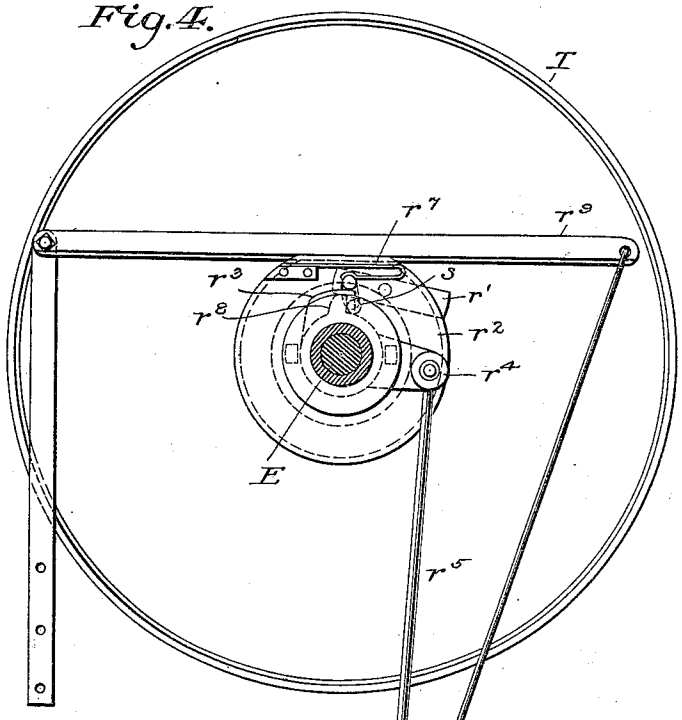


Fig. 6.

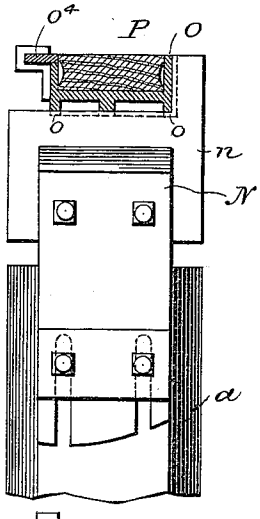


Fig. 7.

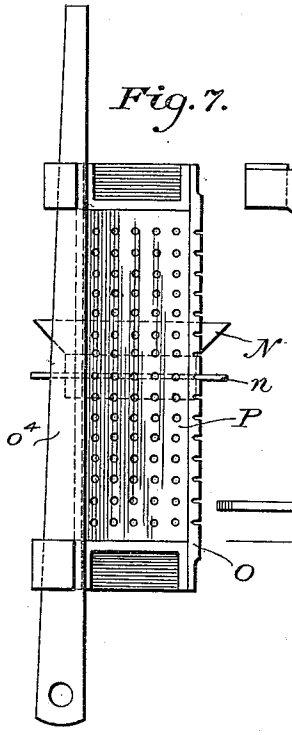


Fig. 8.

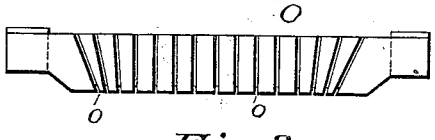
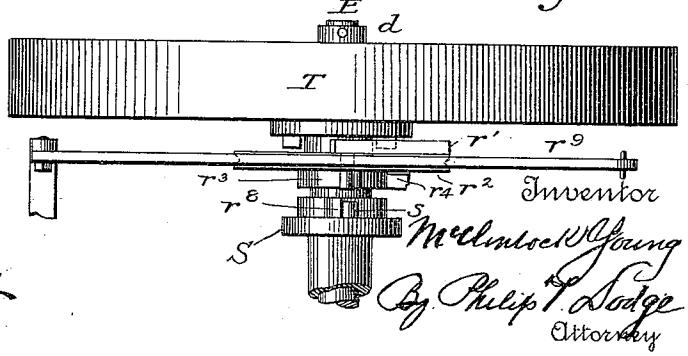


Fig. 5.



Witnesses

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F. A. Emerson.

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McCLINTOCK YOUNG.

BRUSH MACHINE.

No. 544,201. Patented Aug. 6, 1895.

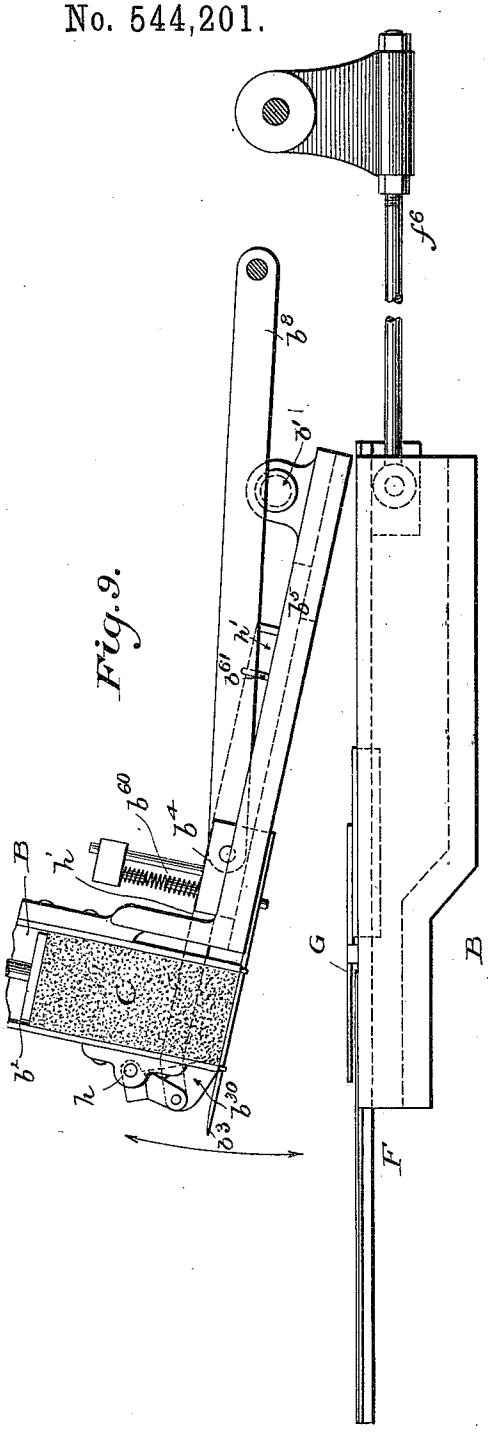

Fig. 9.

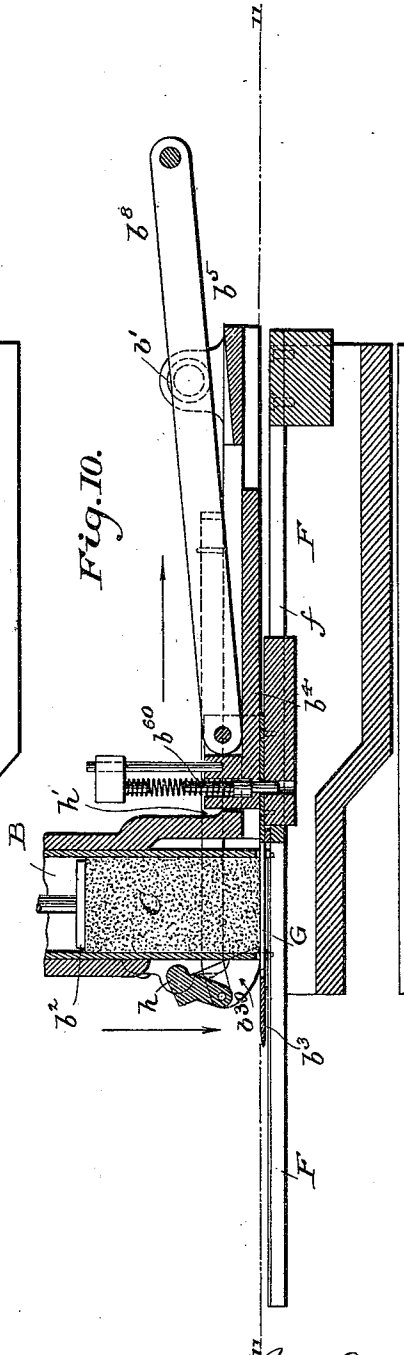

Fig. 10.

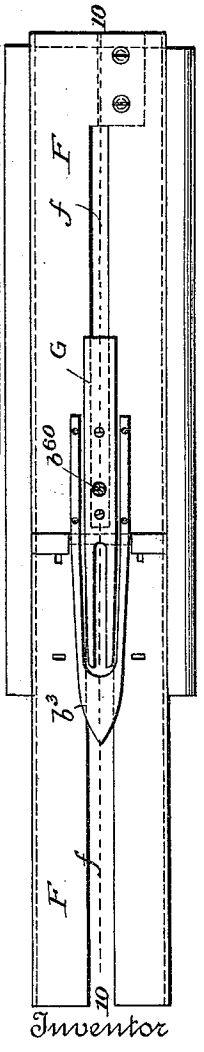

Fig. 11. on line 11-11.

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(No Model.) 9 Sheets—Sheet 6.

McCLINTOCK YOUNG.

BRUSH MACHINE.

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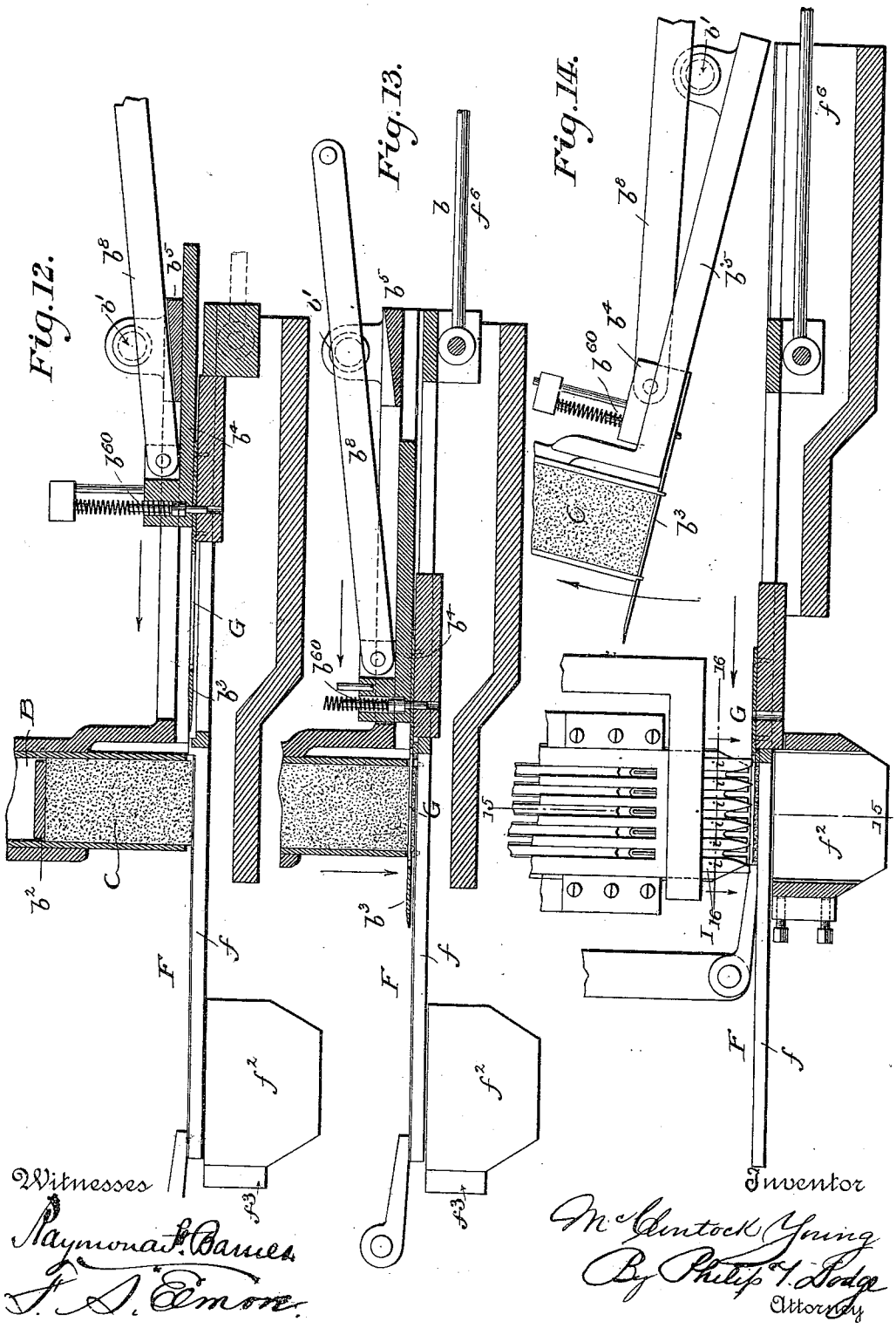

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McCLINTOCK YOUNG.

BRUSH MACHINE.

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Fig. 15.
on line 15–15.

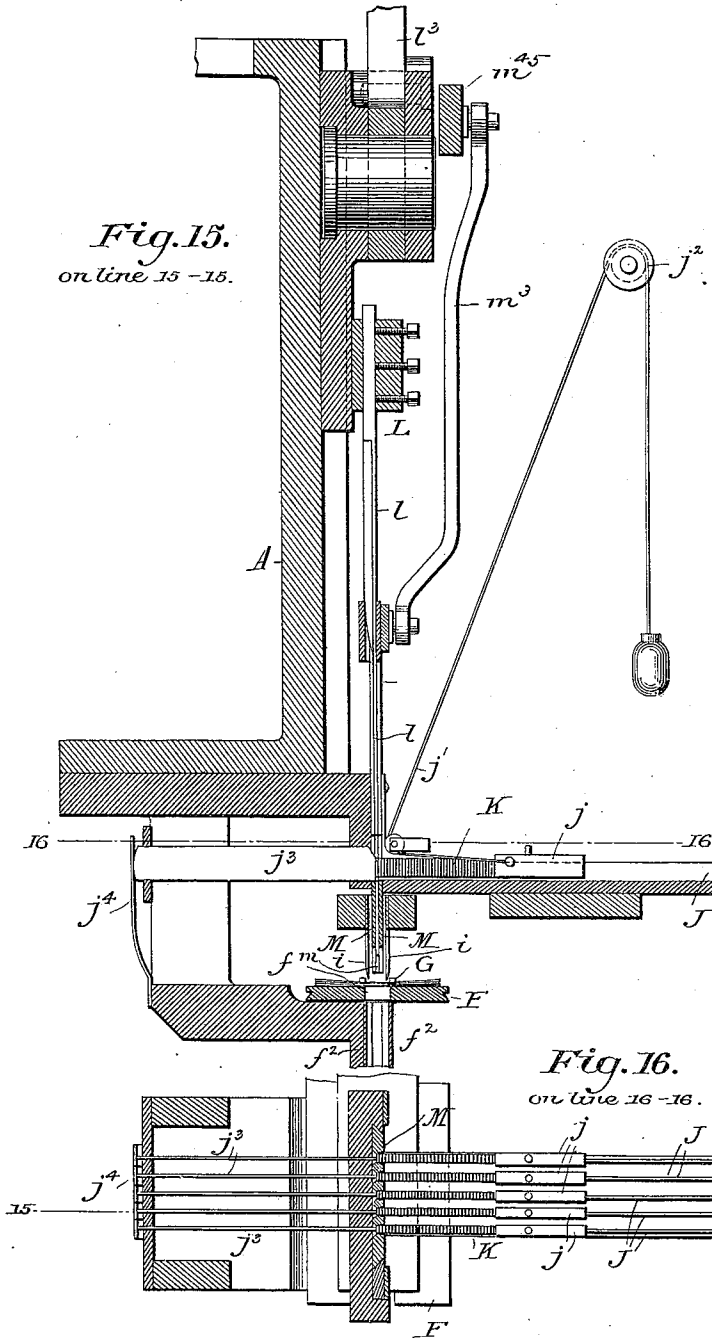

Fig. 17.

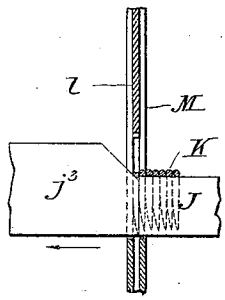

Fig. 16.
on line 16–16.

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(No Model.) 9 Sheets—Sheet 8.

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BRUSH MACHINE.

No. 544,201. Patented Aug. 6, 1895.

Fig. 18.

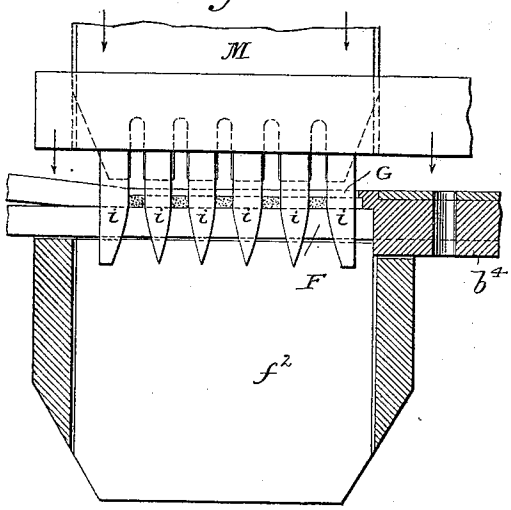


Fig. 19.

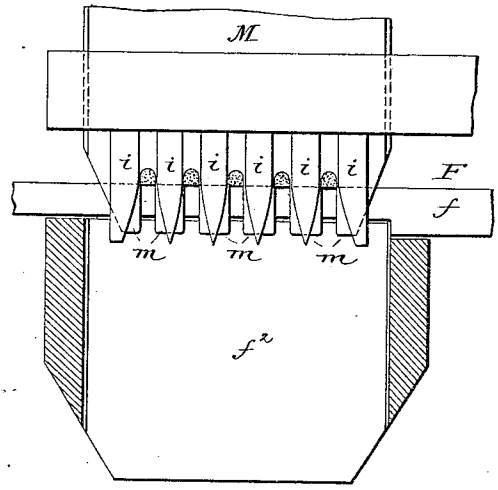


Fig. 20.

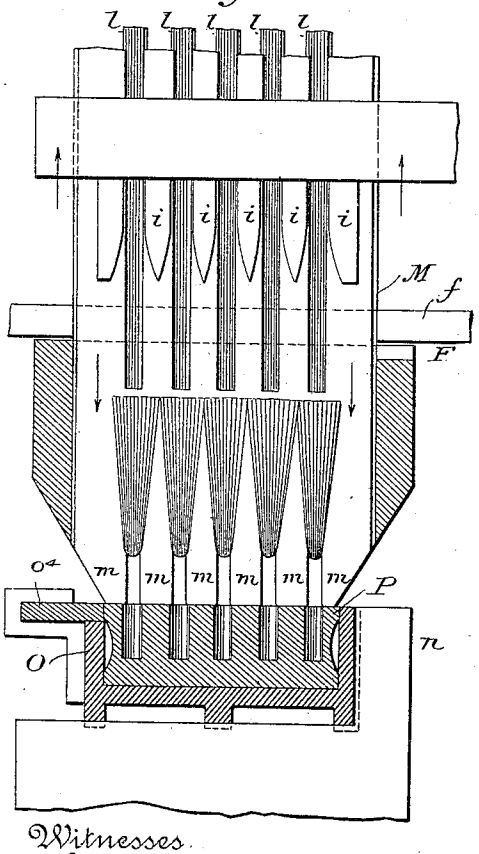
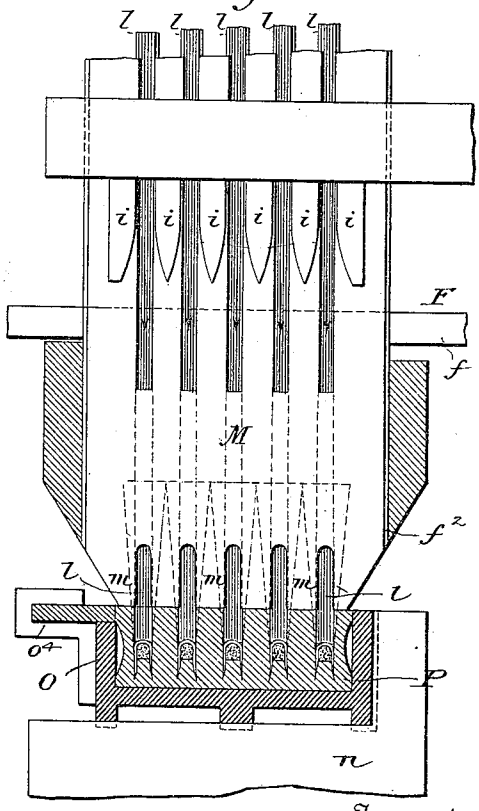


Fig. 21.



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McCLINTOCK YOUNG.

BRUSH MACHINE.

No. 544,201. Patented Aug. 6, 1895.

Fig. 22.

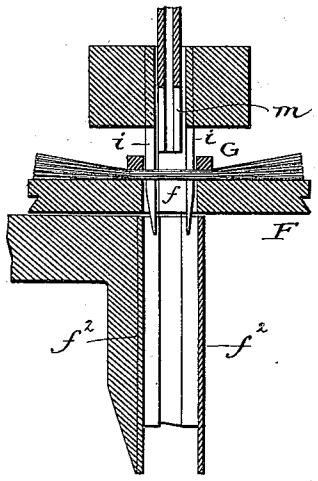


Fig. 23.

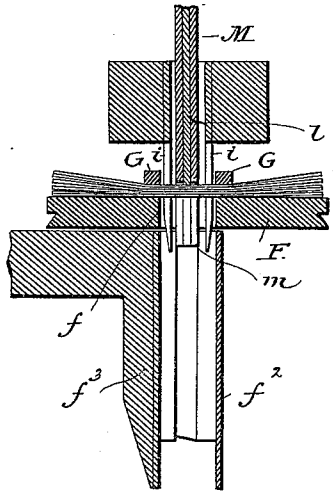


Fig. 24.

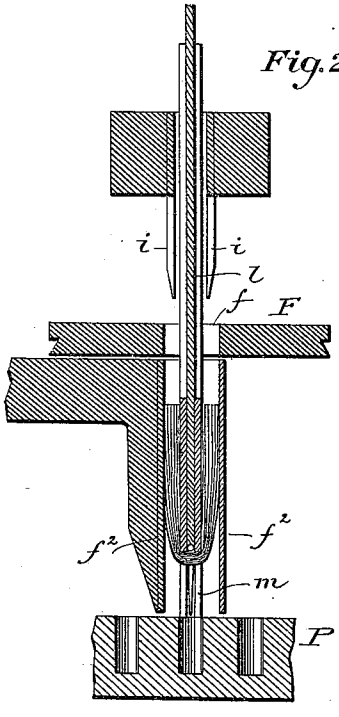
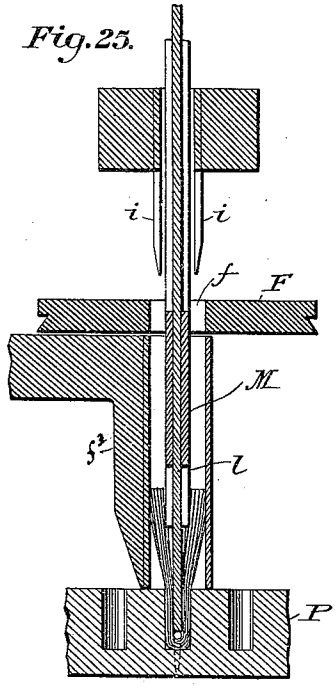


Fig. 25.



WITNESSES:

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F. A. Emmons.

INVENTOR,

McClintock Young

BY

Philip T. Dodge

ATTORNEY.

UNITED STATES PATENT OFFICE.

McCLINTOCK YOUNG, OF FREDERICK, MARYLAND.

BRUSH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 544,201, dated August 6, 1895.

Application filed May 7, 1894. Serial No. 510,378. (No model.)

To all whom it may concern:

Be it known that I, McCLINTOCK YOUNG, of Frederick, county of Frederick, and State of Maryland, have invented a new and useful Improvement in Brush-Machines, of which the following is a specification.

This invention relates to a machine intended for automatically separating a mass of bristles or other fibers into tufts, applying to these tufts metallic staples or other fastening devices, and finally driving the tufts and the fastenings to their places in the previously-bored brush block or body.

To this end the machine comprises means for holding the bristles *en masse*, for separating successive layers or slices from the mass and subdividing these layers into tufts, means for placing the staples in position to straddle the tufts, and means for driving the staples and tufts home to their places, at the same time folding or doubling the tufts through the fastenings.

The machine also includes means for supporting the brush-block and presenting the same in different positions in relation to the driving mechanisms, so that the tufts may be seated in holes at various angles in the body of the block.

Referring to the drawings, Figure 1 represents a perspective view of my machine. Fig. 2 is a front elevation of the same. Fig. 3 is a side elevation of the same from the left, as viewed in Fig. 2. Fig. 4 is a detail view of the driving mechanism with its stopping and starting clutch. Fig. 5 is a plan view of the same. Fig. 6 represents in front elevation the bed-plate support and in sectional elevation the bed-plate and brush-block supported thereon. Fig. 7 is a top plan view of the brush-block support with the brush-block thereon. Fig. 8 is a side view of the brush-block supporting-plate. Fig. 9 is a front elevation of the mechanism for separating the tufts into layers or slices, the slicing devices being in their elevated position. Fig. 10 is a vertical longitudinal section, partly in elevation, on the line 10 10 of Fig. 11, the parts being lowered. Fig. 11 is a horizontal section on the correspondingly-numbered line of the preceding figure, looking in a downward direction. Figs. 12, 13, and 14 are sections similar to Fig. 10, but with the parts in the different positions they occupy during the successive steps of the operation, the last-named view including also the tuft-forming devices. Fig. 15 is a vertical section through the tuft-forming and staple-driving mechanisms on the correspondingly-numbered lines of Figs. 2 and 14. Fig. 16 is a horizontal section on the correspondingly-numbered line of Figs. 2, 3, and 15, looking downward, and showing the manner in which the staples are presented to the driving mechanisms. Fig. 17 is an enlarged sectional view on the same plane as Fig. 15, showing more clearly the staple feeding and driving devices. Figs. 18 to 21, inclusive, are vertical sections, showing the tuft-forming and staple-driving mechanisms in their successive positions, the sections being taken in planes parallel with the front of the machine. Figs. 22 to 25 are vertical sections in a fore-and-aft direction, showing the same parts as Figs. 18 to 21 in corresponding positions. Fig. 26 is a front elevation of the lower end of the magazine, showing the pusher mechanism which acts on the bristles within the same.

In the accompanying drawings, A represents a rigid main frame, which may be of any form adapted to sustain the parts hereinafter described.

B is an upright magazine or box intended to receive *en masse* the bristles or other fibers C, which are previously cut to a uniform length. This magazine is attached rigidly to a supporting-arm b, mounted on a horizontal axis b', so that it may swing upward and downward for a purpose presently to be described.

The mass of bristles is urged constantly downward by a gravitating follower b^2 and is sustained ordinarily by an underlying blade b^3, carried by a slide b^4 moving in a guideway in an arm b^5 fixed to the lower end of the magazine, and also mounted on the axis b' to swing thereon, as shown particularly in Fig. 2 and Figs. 9 to 14. Under this arrangement the blade b^3 may be projected across or withdrawn from under the mouth of the magazine. The magazine is caused to swing bodily upward and downward at regular intervals by a stud or pin b^6 projecting from the side of its supporting-arm into a cam-groove b^7 in the rear face of a large cam-wheel D, mounted

on the horizontal main shaft E seated in fixed bearings on the frame. On the main frame below the magazine there is mounted a horizontal guide F, containing a longitudinal vertical slot *f*, serving to guide a block attached to and carrying the forked finger G, as clearly shown is Figs. 9, 10, and 11. This finger is made of suitable form to fit within the blade b^3, which is slotted to receive it, as shown in the several figures.

When the magazine is elevated, as shown in Fig. 2 and 9, the blade b^3 stands beneath and gives support to the mass of bristles, and when the magazine is lowered the blade b^3 closes over the finger G, as shown in Figs. 10 and 11. At this time the lower end of the magazine lies immediately above the guide F, as shown in Fig. 10, so that when the blade b^3 and finger G are retracted, as shown in Fig. 12, the mass of bristles will descend and rest upon the guide F. If, now, the blade and the finger are advanced, as in Fig. 13, they will pass through the mass and separate a slice or layer of bristles from those above, as clearly shown. Inasmuch as the blade and the finger both lie above the slice the magazine may be lifted to its elevated position, as shown in Fig. 9, carrying with it the blade b^3 to sustain the mass of bristles, while the finger G remains in its lower and projected position, so as to confine the separated slice between it and the guide F, as plainly shown in Fig. 9.

The guide F, which it will be remembered gives support to the finger G, is arranged to slide endwise in guides in the main frame, so that after the slice is separated from the mass and confined upon the guide F the latter may be moved forward endwise to the left from its original position to a point beyond the magazine, as shown in Fig. 14, thus carrying the slice forward into position to be acted upon by the overlying mechanism for separating it into tufts and driving the tufts into the block or body.

I will omit for the present a description of the mechanisms for imparting the longitudinal motions to the slide and finger, remarking, however, that the slide which carries the blade b^3 also carries a spring-depressed pin b^{60}, which when the parts are lowered enters a corresponding hole in the sliding block which carries finger G, (see Figs. 10, 11, and 12,) thus locking the finger and the blade together for the time being, so that they will move forward in unison while the box remains down.

In order to prevent the bristles from escaping between the lower end of the magazine and the upper surface of the blade b^3, I project the walls of the magazine downward slightly past the edges of the blade, as shown in Figs. 2, 9, 10, and 14. In order to prevent the bristles from being crowded or pinched into the angular space between the wall of the magazine and the forward end of the blade b^3 I provide as a desirable, but not necessary feature, a pressure device (shown in Figs. 2, 9, and 10,) consisting of an arm b^{30}, mounted at its upper end on a horizontal pivot *h* on the side of the magazine. The lower end of the arm is slotted, forming in effect a series of fingers extending side by side and adapted to project through slots formed in the side of the magazine at its lower end and acting to crowd or push back the fibers. This arm is pivoted at its side to one end of a rod *h'*, which rests upon the upper side of the arm b^5, and which is arranged to move to a limited extent in a guide b^{61} thereon. The construction is such that when the parts are in the position shown in Fig. 9 the weight of the arm *h'* will draw the fingers inward through the slots in the magazine and push back the fibers.

I will now pass to a description of the devices for separating the confined slice into tufts for presenting the staples astride of the tufts and driving both to their places in the block.

The means for dividing the slice into tufts consists simply of two parallel vertically-guided plates I, having their lower edges divided into a series of pointed fingers *i*, which, standing normally above the separated slice, as shown in Fig. 14, may be thrust downward therethrough and through the slot in the guide F, as shown in Figs. 18 and 22, thus dividing the slice into a series of tufts or bunches, which are supported horizontally and confined closely between the dividing-fingers, the overlying finger G and the underlying guide F. It is to be observed that the tufts thus confined lie midway of their length, across the slot in the guide F, so that if downward pressure be applied to them at the middle they will be carried downward through the slot and folded or doubled by this action. Plates f^2 and f^2, extending downward, form continuations of the slot in the guide F, as shown in Figs. 1, 2, 22, and 23, to hold the descending tufts and prevent them from reopening. The plates f^2 are sustained in a holder f^3 fixed to the main frame of the machine. Before the tufts are thus driven downward it is necessary to present the staples or fastenings astride of them. This is effected, as shown in Figs. 1, 2, 15, 16, and 17. The plates I are L-shaped, one arm being supported in vertical guides i^6 on the frame of the machine and the other arm extending horizontally above the guide F, as shown in Figs. 1 and 2. A series of horizontal fixed bars J, lying in parallel lines, terminate at their inner ends immediately over the tufts. The staples K are placed in long rows astride of these bars, and are pushed inward by slides *j*, actuated by weighted cords *j'* passing over guide-pulleys j^2. Opposite the inner end of each guide J there is arranged a horizontally-yielding bar j^3, mounted in the main frame and pressed forward by spring j^4. (See Figs. 15 and 16.) Each bar rests normally against the end of the corresponding guide J, and is beveled away on its upper forward corner, as shown in Fig. 17, in order to leave an angular space

to receive and hold the staples one at a time as they pass forward from the ends of their supporting-guides J. This arrangement insures the holding of one staple at a time in the exact position necessary to straddle the underlying tuft when driven downward thereover.

The driving of the staples is effected by a series of fingers *l*, projecting downward from a vertically-guided carrying-plate L in such positions that when they descend they will act each upon a staple and drive the latter downward between the end of its support J and the end of the yielding bar j^3 until it straddles the tuft and is finally carried within the bight of the latter downward into the hole of the brush-body, as clearly shown in Figs. 20, 24, and 25.

In order to hold and guide the staple and also to assist in folding, guiding, and driving the tuft, I mount on opposite sides of the driving-fingers *l* and between the dividing-fingers *i* two vertically-guided plates M, the lower ends of which are divided into vertical fingers *m*, which, descending in relation to the fingers *i*, embrace the tufts between them, drive the tufts with a folding action down through the slot of the guide F, and continue downward until their lower ends rest on the surface of the brush-block between the holes therein, as shown in Figs. 20, 21, 24, and 25. These fingers *m*, resting on the block as stated, serve as guides for the tufts and the staples, so that when the driving-fingers *l* continue to descend they will force the tufts and the staples out from between the fingers *m* and downward beyond them into the holes in the block, as plainly indicated in Figs. 21 and 25, the pressure being continued until the ends of the staples are seated deeply into the wood, in the manner shown in Fig. 21, so as to hold the tufts securely in place.

In order to give support to the brush-block during the introduction of the tufts and to present the block in different angular relations to the driving devices as may be demanded by the varying positions of the tufts, I make use of the parts plainly shown in Figs. 1, 2, 3, 6, 7, and 8. A standard *a* on the main frame gives support to a vertical slide N, carrying at its upper end a vertically-adjustable angular blade *n*, designed to give support to a bed-plate O, in which the brush-block P is seated. The slide N is connected with the stud or roller *n'*, entering an eccentric or cam-slot in lever n^2, pivoted to the frame at n^3, and connected by a rod n^4 to a crank pin or wrist on the main driving-wheel D.

The form of the cam-slot is such that when the lever is vibrated by the driving mechanism it will elevate the slide N and the brush-block P until the latter stands against or in close proximity to the plates f^2 in a position to receive the tufts as they are driven down between these plates. After each action of the tuft-driving devices the brush-block is again lowered in order to withdraw the driven tufts from between the plates f^2, so that the block may be moved endwise on its support in order to bring the next line of holes in position to receive their tufts.

The bed-plate or anvil O, which may also be denominated the "brush-block holder," has on its under side a series of transverse grooves or slots *o*, which are continued up across the rear edge or side, as viewed in Fig. 1. (See also Figs. 6 and 7). It rests on, and is sustained by, the angular blade *n*, the grooves in the bottom receiving the horizontal edge of said blade and those in the edge the angular or vertical edge thereof, as indicated in Fig. 6.

The tuft and staple driving devices work directly above the blade *n*, in the same plane therewith, and the grooves in the bed-plate are so disposed, and the brush-block so bored, that the transverse rows of holes coincide with the grooves when the block is in position to receive the tufts, from which it will be seen that in any position of the bed-plate a row of holes will be directly above the supporting-blade *n* and directly beneath the tuft and staple driving devices, in position to receive the tufts and staples when they are driven down. The bed-plate is moved along step by step by hand to present the different rows of holes for the reception of the tufts.

In case the tuft-holes are bored straight into the block, in a direction at right angles to its face, the grooves in the edge of the bed-plate will also be vertical to the face thereof, but if the holes, or any of them, are inclined, the corresponding grooves in the bed-plate will also be inclined in the same direction and to the same extent, so that the block may be held in proper angular position relatively to the driving devices to receive the tufts in the inclined row, or rows, of holes.

In Fig. 8 three grooves at either end are represented as being inclined outwardly at different angles, while those in the central portion are vertical and parallel. It will be understood that the block to be supported on this bed-plate is supposed to be bored, so that the rows of holes bear corresponding angular relations to each other.

For the purpose of securing the brush-block firmly in the supporting-anvil, the latter is provided on its upper side with a surrounding raised rim or flange forming a trough in which the block is placed and held. At one side the flange is lower than at the other and on this low side it is provided with a longitudinal wedge o^4, bearing in ears thereon, and also bearing against the side of the brush-block to force it tightly against the opposite flange and prevent it from falling out of the anvil as the latter is shifted by hand from one position to another.

For imparting motion to the various parts of the tuft forming and driving devices I make use of the following arrangement: The main shaft E, provided with a driving-pulley T on one end, is seated in bearings in the

main frame, and carries at its opposite end the main cam-wheel D before mentioned. In this wheel are formed in its two faces the several cam-grooves for operating the various parts. The slide F for carrying the slice of bristles forward is actuated, as shown in Figs. 1 and 2, by rod f^6, adjustably connected with the lower end of lever f^7, pivoted at its upper end to the main frame and provided with a stud f^8 entering cam-groove f^9. The slide b^4, which carries the slicing-blade b^3, is operated, as shown in Figs. 1, 2, 9, 12, &c., by the link b^8, before alluded to, connected to lever b^9, pivoted midway of its length to the main frame and carrying stud b^{10}, which enters a cam-groove in the rear face of the wheel.

The plates I, which carry at the lower edges of their horizontal arms the tuft forming and separating fingers i, are operated by a lever V to one end of which they are coupled, the said lever being fulcrumed at an intermediate point in its length on a stud v projecting from the frame of the machine and actuated by a cam v' on the main shaft back of the cam-wheel D, as indicated in Fig. 2. The cam v' only operates to depress the plates. They are moved in the opposite direction by a spring w, which holds them normally in elevated position.

The staple-driving slide L receives motion through link l^3 from one end of a walking-beam l^4, which in turn receives motion at its opposite end through link l^5 from the crank-pin on the wheel D. The tuft-slide M, provided with the tuft-guiding fingers m, receives motion through link m^3 from an elbow-lever m^4 pivoted to a plate or projection carried by the slide L. This elbow-lever while being carried bodily upward and downward receives motion through a stud on one end entering a cam-slot m^5 in a fixed plate.

The slide M is carried downward by the movement of the walking-beam l^4 and intermediate connections until its lower end rests upon the brush-block, at which point in its movement the stud upon the elbow-lever m^4 is at or near the bottom of the cam-slot m^5.

As the brush-blocks vary in thickness, and as their position in relation to the slide M varies from changes in the angle at which they are presented to it, it becomes necessary to provide means by which the elbow-lever m^4 may be allowed to yield and accommodate itself to these variations in position. For this purpose the lower part of the slot m^5 is cut away at one side, and the opening thus formed is closed by a pivoted bar m^6 held against movement by a strong spring m^7, the movement of the bar in the opposite direction being limited by an adjustable stop m^8.

The main driving-wheel revolves continuously, but imparts intermittent rotation to the main shaft at the will of the operator through the clutch mechanism illustrated in Figs. 4 and 5. As shown in these figures, the driving-pulley T is loosely mounted upon the shaft E, carrying the cam-wheel D, and it is retained thereon by a collar d. The hub of the driving-wheel carries one or more projecting lugs, which, by the rotation of the wheel, are brought into contact with the spring-latch r', mounted upon a disk r^2, rigidly secured to the shaft E. This latch is normally held out of the path of movement of the projections upon the driving-pulley by a cam r^3, mounted upon a collar carried loosely by the shaft E, the collar being provided at one side with a projecting arm r^4, connected by a rod r^5 with a foot-lever r^6 within reach of the operator. The depression of the foot lever rotates the cam upon the shaft and releases the catch, which drops in position to be engaged by the projecting lugs upon the hub of the driving-pulley, the catch being forced downward by a flat spring r^7, mounted upon a disk, and bearing upon the pin projecting from the catch.

In order to limit the movement of the foot-lever and its connected cam, I provide a pin s, projecting from the bearing S, in which the shaft E is supported, and provide the collar of the cam r^3 with a projecting lip r^8, adapted to engage against this pin. As will be seen the operation of the foot-lever rotates the cam r^3 upon the shaft, and drops the latch into position to be engaged by the projections on the hub of the wheel, the release of the foot-lever being followed by the return of the cam to its proper position, which movement is limited by the projecting lug r^8 striking against the pin s. The continued rotation of the pulley carries the disk and the latch therewith around to its previous position, in the course of which movement the pin is re-engaged by the cam and the latch again lifted, thereby freeing the wheel.

In order to automatically stop the rotation of the parts in the proper position, I provide the disk r^2 with a circumferential groove having at one side a flattened portion within which is fitted a bar r^9, pivoted at one end to the frame of the machine and connected at the other with a spring r^{10}, which exerts a pressure downward upon the rod and holds it in engagement with the disk. Any tendency of the parts to be carried by friction beyond their normal positions will be prevented by the extra tension of the spring exerted upon that part of the disk which is flattened.

As an additional safeguard against carrying the parts beyond their proper position, I may apply a brake to the circumference of the cam-disk, as shown in Figs. 1 and 2.

Having thus described my invention, what I claim is—

1. In a brush machine and in combination with means for supporting a slice or layer of bristles, fingers to divide the slice into tufts, fingers to maintain the separation of the tufts, and driving fingers or blades to carry the tufts into the block or body.

2. In a brush machine and in combination with means for sustaining a slice or layer of bristles, the separating fingers, the guide fin-

gers for the tufts, the driving fingers or blades and means for presenting the tuft fasteners beneath the driving blades and above the tufts.

3. In a brush machine and in combination with means for supporting a slice or layer of bristles, the dividing fingers to separate the tufts, the guide fingers arranged to contact with the brush block, the driving blades or fingers, means for presenting the fasteners to the driving blades and guide blades such as f^2, between which the tufts are carried to the block or body.

4. In a brush machine and in combination with the magazine for the bristles, the reciprocating slicing blade b^3, and a movable finger or pusher acting in the magazine on the bristles and means for moving the pusher to force back the bristles, substantially as described.

5. In a brush machine and in combination with means for seating the tufts in the brush block or body, a bed-plate or holder for the brush block provided in its vertical side or edges with grooves or slots in angular relations corresponding with the angular direction of the holes in the brush block, and a support for said bed-plate extending beneath and sustaining the same and provided with a vertical portion adapted to enter the grooves therein, substantially as described; whereby the block may be held and presented in different relations to the driving mechanism.

6. In a brush machine the combination of a support or holder for the brush block, provided with a series of grooves extending transversely across the bottom and across one edge and an angular supporting blade adapted to engage in said grooves and sustain the block in position, substantially as described.

7. The holder for a brush block consisting of a bottom portion provided with vertical side walls one of said walls being of less height than the others, ears at the opposite ends of the low wall and a longitudinal wedge seated upon said wall, engaging at one edge against the ears and at its opposite edge against the side of the brush block throughout its length.

8. In a brush machine and in combination with the centrally arranged driving blades, the dividing fingers and the tuft guiding fingers, arranged in pairs on opposite sides of the driving blades.

In testimony whereof I hereunto set my hand this 27th day of March, 1894, in the presence of two attesting witnesses.

McCLINTOCK YOUNG.

Witnesses:
J. MARSHALL MILLER,
MARSHALL FOUT.